To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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# 2SC2734

Silicon NPN Epitaxial

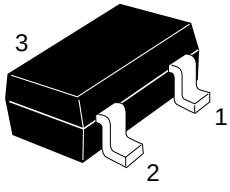
ADE-208-1074 (Z)
1st. Edition
Mar. 2001

## Application

- UHF frequency converter
- Local oscillator, wide band amplifier

## Outline

MPAK




1. Emitter
2. Base
3. Collector

Note: Marking is “GC”.

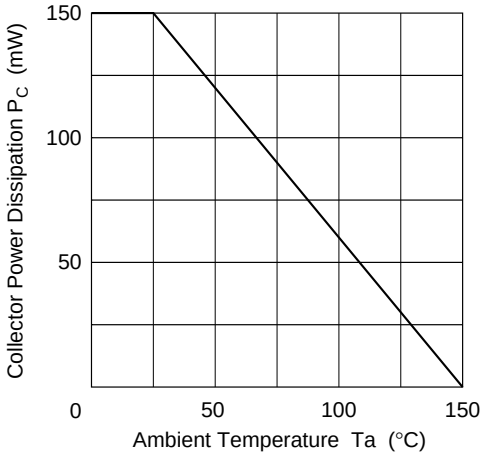
## Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | 20 | V |
| Collector to emitter voltage | $V_{CEO}$ | 11 | V |
| Emitter to base voltage | $V_{EBO}$ | 3 | V |
| Collector current | $I_C$ | 50 | mA |
| Collector power dissipation | $P_C$ | 150 | mW |
| Junction temperature | Tj | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

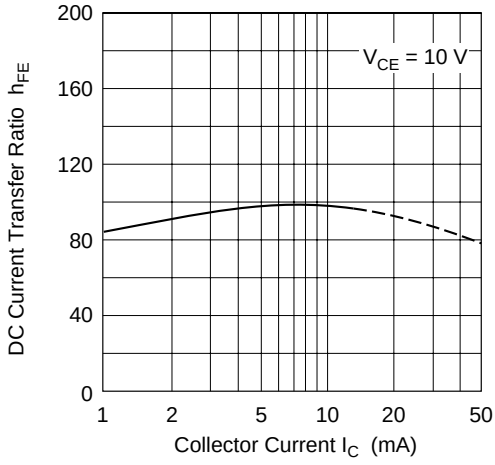
## Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Collector to base breakdown voltage | $V_{(BR)CBO}$ | 20 | — | — | V | $I_C$ = 10 µA, $I_E$ = 0 |
| Collector to emitter breakdown voltage | $V_{(BR)CEO}$ | 11 | — | — | V | $I_C$ = 1 mA, $R_{BE}$ = |
| Emitter to base breakdown voltage | $V_{(BR)EBO}$ | 3 | — | — | V | $I_E$ = 10 µA, $I_C$ = 0 |
| Collector cutoff current | $I_{CBO}$ | — | — | 0.5 | µA | $V_{CB}$ = 10 V, $I_E$ = 0 |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | — | — | 0.7 | V | $I_C$ = 10 mA, $I_B$ = 5 mA |
| DC current transfer ratio | $h_{FE}$ | 20 | 90 | 200 | | $V_{CE}$ = 10 V, $I_C$ = 5 mA |
| Gain bandwidth product | $f_T$ | 1.4 | 3.5 | — | GHz | $V_{CE}$ = 10 V, $I_C$ = 10 mA |
| Collector output capacitance | Cob | — | 0.9 | 1.5 | pF | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz |
| Conversion gain | CG | — | 15 | — | dB | $V_{CC}$ = 6 V, $I_C$ = 2 mA, f = 900 MHz, $f_{OSC}$ = 930 MHz (0dBm), $f_{out}$ = 30 MHz |
| Noise figure | NF | — | 9 | — | dB | $V_{CC}$ = 6 V, $I_C$ = 2 mA, f = 900 MHz, $f_{OSC}$ = 930 MHz (0dBm), $f_{out}$ = 30 MHz |
| Oscillating output voltage | $V_{OSC}$ | — | 140 | — | mV | $V_{CC}$ = 6 V, $I_C$ = 5 mA, f = 930 MHz |

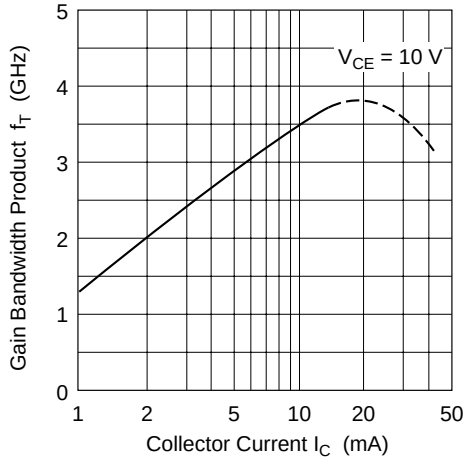
Maximum Collector Dissipation Curve



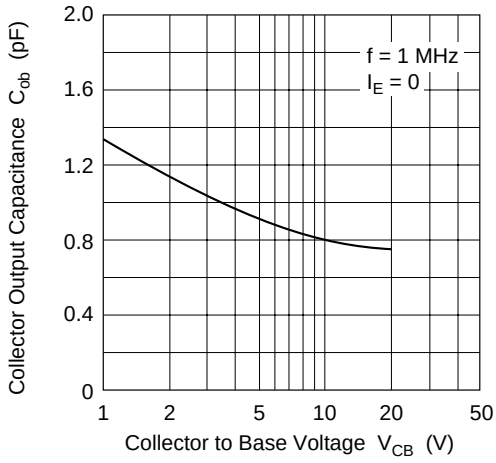

DC Current Transfer Ratio vs. Collector Current



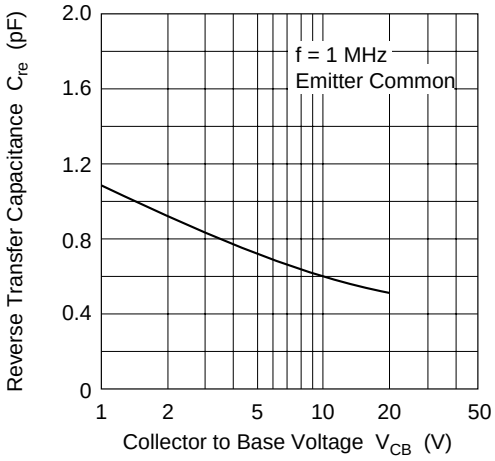

Gain Bandwidth Product vs. Collector Current



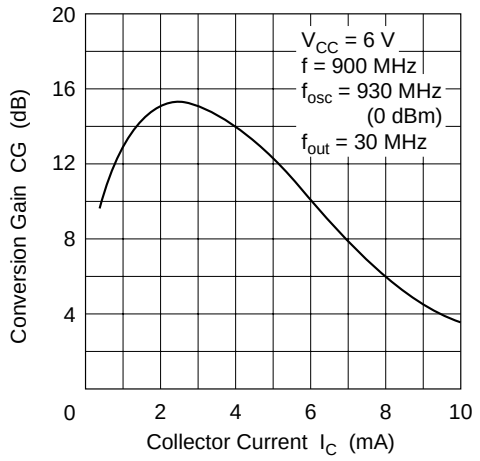

Collector Output Capacitance vs. Collector to Base Voltage



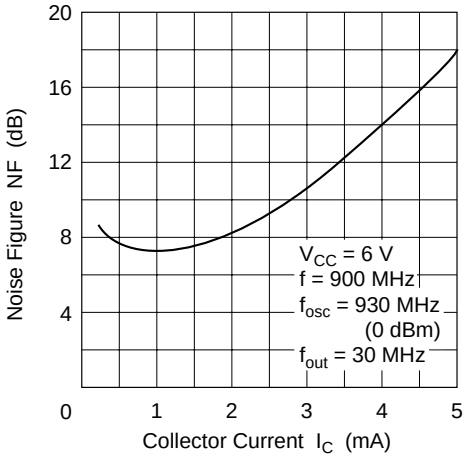
Reverse Transfer Capacitance vs. Collector to Base Voltage



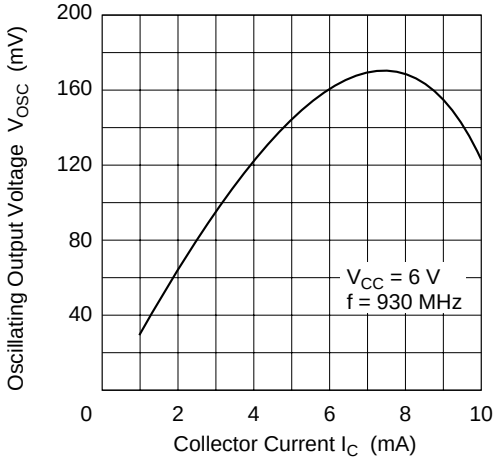

Conversion Gain vs. Collector Current



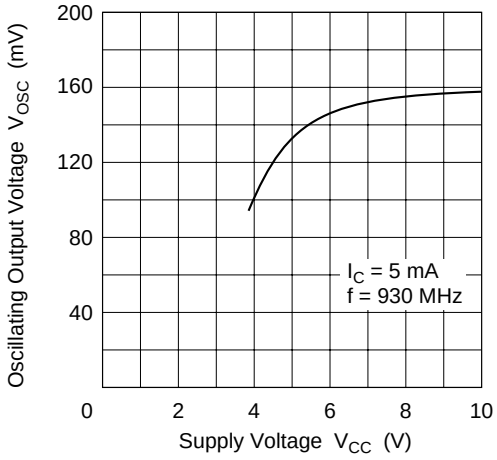

Noise Figure vs. Collector Current



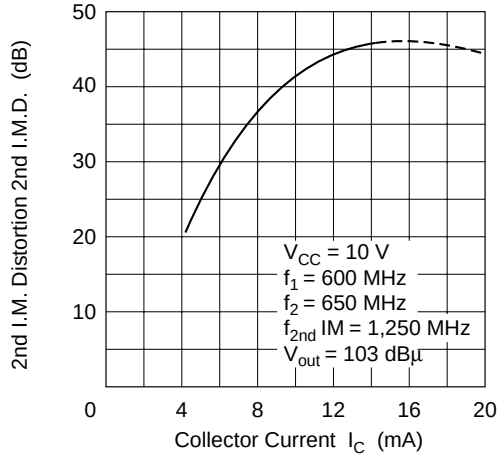

Oscillating Output Voltage vs. Collector Current



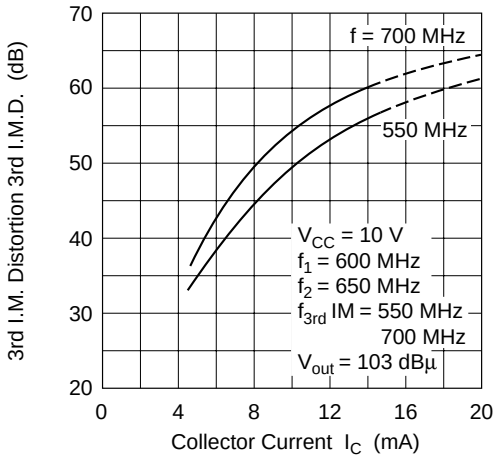
Oscillating Output Voltage vs. Supply Voltage



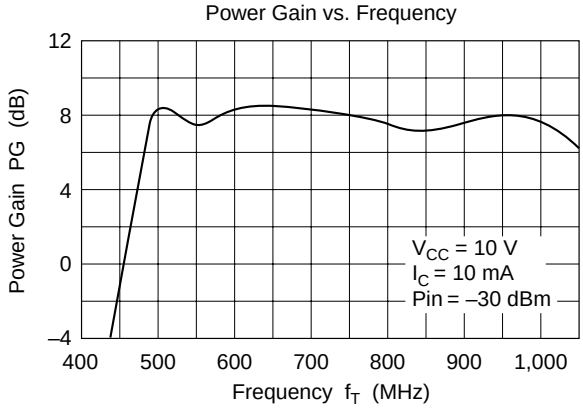

2nd I.M. Distortion vs. Collector Current



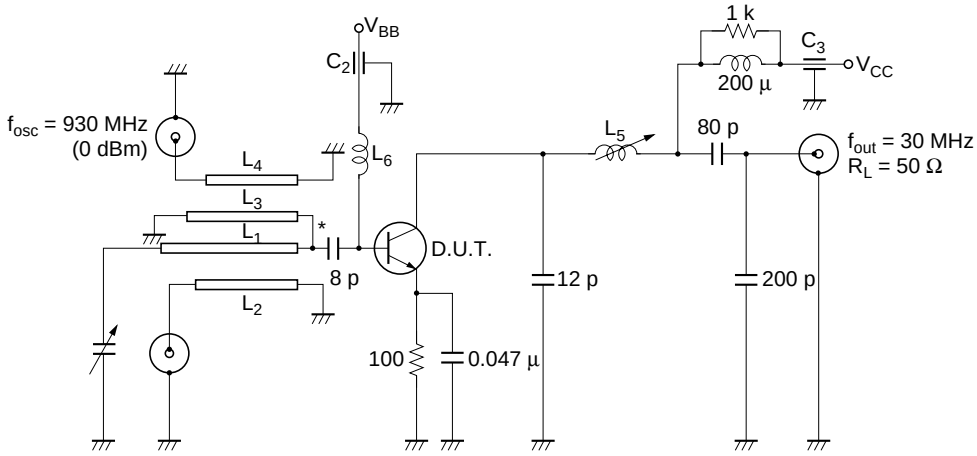

3rd I.M. Distortion vs. Collector Current




Power Gain vs. Frequency



Conversion Gain, Noise Figure Test Curcuit



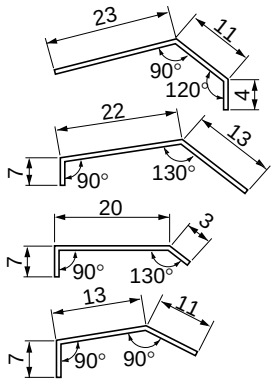

*···· Disk Capacitor
Unit R : Ω
C : F
L : H

$L_1$ : ϕ1 mm Enameled Copper wire

$L_2$ : ϕ1 mm Enameled Copper wire

$L_3$ : ϕ1 mm Enameled Copper wire

$L_4$ : ϕ1 mm Enameled Copper wire




Unit : mm

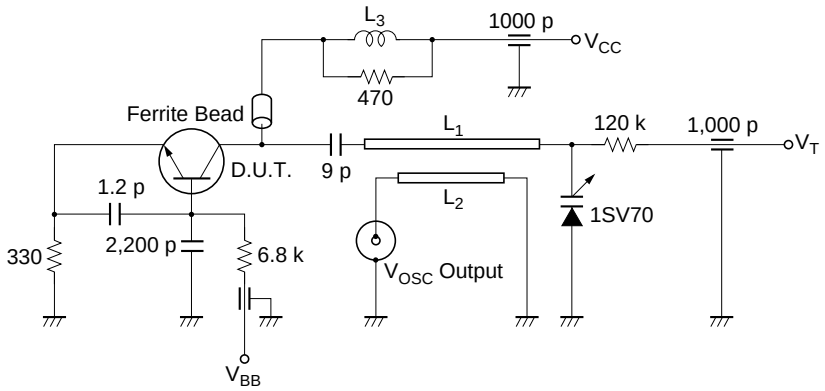
$L_5$ : Bobbin ϕ5 mm inside dia, ϕ0.2 mm 20 Turns Enameled Copper wire

$L_6$ : ϕ0.5 mm Enameled Copper wire 1 Turn inside dia ϕ6 mm

$C_1$ : 20 pF max. Air Trimmer Condenser

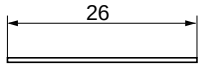
$C_2$, $C_3$ : 1000 pF Air Core Capacitor

$V_{OSC}$ Test Circuit

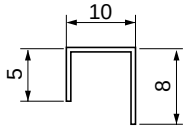



Unit C : F
R : Ω

$L_1$ : ϕ1 mm Enameled Copper wire

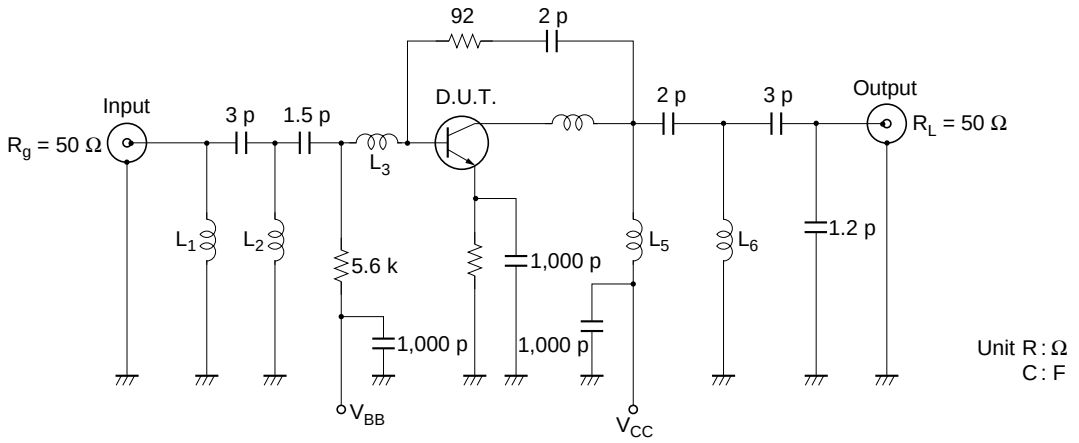



$L_2$ : ϕ0.8 mm Enameled Copper wire




$L_3$ : ϕ0.3 mm Enameled Copper wire, 10 Turns with 470 Ω Resistor

Circuit Example-UHF Wide Bandwidth Amplifier (f = 500 MHz to 950 MHz)




$L_1$ : $\phi$0.5 mm Copper wire 5 Turns inside dia $\phi$3 mm

$L_2$ : $\phi$0.5 mm Copper wire 2 Turns inside dia $\phi$2 mm

$L_3$ : $\phi$0.5 mm Copper wire 2 Turns inside dia $\phi$2 mm

$L_4$ : $\phi$0.5 mm Copper wire 1.5 Turns inside dia $\phi$2 mm

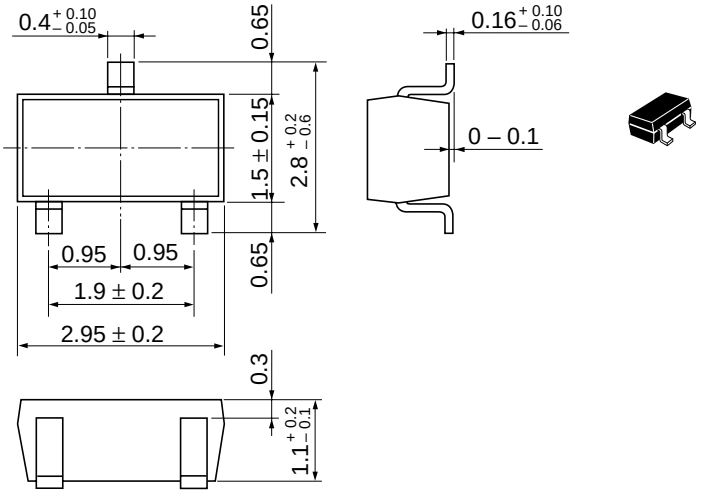
$L_5$ : $\phi$0.5 mm Copper wire 4 Turns inside dia $\phi$2 mm

$L_6$ : $\phi$0.5 mm Copper wire 3 Turns inside dia $\phi$2 mm

## Package Dimensions

As of January, 2001

Unit: mm




| | |
|---|---|
| Hitachi Code | MPAK |
| JEDEC | — |
| EIAJ | Conforms |
| Mass (reference value) | 0.011 g |

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